

# *Cornisepta guzmani* new species: first species of genus confirmed from Pacific cold seep environments off central Chile (Gastropoda: Vetigastropoda: Fissurellidae)

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## ABSTRACT

The new bathyal gastropod species, *Cornisepta guzmani* new species, collected at a depth of 846 metres from a methane seepage site in the subduction zone off Concepción (36°22' S; 73°43' W), central Chile, is described. The new species is most similar to *Cornisepta pacifica* (Cowan, 1969), described from offshore Alaska and Oregon, from which it differs in shell morphology, sculpture, and geographic distribution.

*Additional Keywords:* Deep water, deep sea

## INTRODUCTION

The genus *Cornisepta* was established to group a series of small, deep-water fissurellids with high conical shells, lacking a selenizone, with a prominent internal septum, and that shed the protoconch as they age (McLean and Geiger, 1998). The genus comprises thirteen extant worldwide species, of which seven have been described from the Pacific Ocean: *Cornisepta antarctica* (Egorova, 1972), *C. festiva* (Crozier, 1966), *C. levinae* McLean and Geiger, 1998, *C. monsfuji* Chino, 2009, *C. pacifica* (Cowan, 1969), *C. soyoa* (Habe, 1951) and *C. verena* McLean and Geiger, 1998. The genus has records up to the early Oligocene, with two species described for the early Rupelian of Germany; *Cornisepta anhaltina* Müller, 2011 and *C. granulocostata* Müller, 2011 (Müller, 2011). Recent species of *Cornisepta* have been recorded in deep-sea environments, in faunal associations of seamounts (Beck et al., 2006), in reducing systems at hydrothermal vents in mid-oceanic ridges (Sasaki et al., 2010), and cold seeps at continental margins (Gracia et al., 2011). Little is known of their population biology, ecology and conservation status.

This article describes *Cornisepta guzmani* based on shell morphology and sculpture of two specimens collected in methane-hydrate rubble and inside the valves

of a vesicomid clam collected in a methane cold seep off Concepción Bay, central Chile. In addition, external morphology and details of sculpture were compared with that of congeneric species in the Pacific Ocean and a species from the Atlantic Ocean.

## MATERIALS AND METHODS

The description of the new species is based on two specimens collected from rubble trawled from a methane cold seep off the coast of Concepción Bay, central Chile (36° 22' S; 73° 43' W). The holotype and paratype are deposited under accession number 2013-001 in the collections of the Santa Barbara Museum of Natural History, Santa Barbara, California, USA (SBMNH).

For the morphological descriptions, the length (L), height (H) and width (W) of the shells were measured from photographs and scanning electron micrographs. The position of the foramen (PF) was defined as the distance of the centre of the foramen measured from the anterior shell margin.

## SYSTEMATICS

Class Gastropoda Cuvier, 1797  
Suborder Vetigastropoda Salvini-Plawen, 1980  
Family Fissurellidae Fleming, 1822  
Subfamily Emarginulinae Children, 1834

### Genus *Cornisepta* McLean and Geiger, 1998

**Type Species:** *Fissurisepta antarctica* Egorova, 1972 (by original designation), Recent, Weddell Sea, Antarctica (McLean and Geiger, 1998: 18).

**Remarks:** Chino (2009) and Müller (2011) erroneously attributed the genus name to McLean alone.

*Cornisepta guzmani* new species  
(Figures 1–7)

**Diagnosis:** Small fissurellid (up to 5.3 mm), conical profile, foramen at summit of shell, anterior slope convex, posterior slope concave, septum high, across, thin, sculpture of widely spaced pustules randomly hyperdispersed.

**Description:** Shell of moderate size for genus, yellowish-white, conical, anterior slope convex, profile moderately high (66% of length), posterior slope concave. Juvenile shell and protoconch unknown. Foramen oval, situated in posterior third of shell length. Sculpture of concentric growth marks with widely spaced pustules arranged randomly hyperdispersed. Interior of shell glossy, septum thin, slightly curved, transverse, extending obliquely downward at an angle of approximately 42° from the anterior slope for almost half the height of the shell. Outline of peristome flat.

**Type Material:** Holotype SBMNH 236523, 5.26 × 3.77 × 3.47 mm (L×W×H); paratype SBMNH 236524, 2.66 × 1.71 × 1.55 mm (L×W×H).

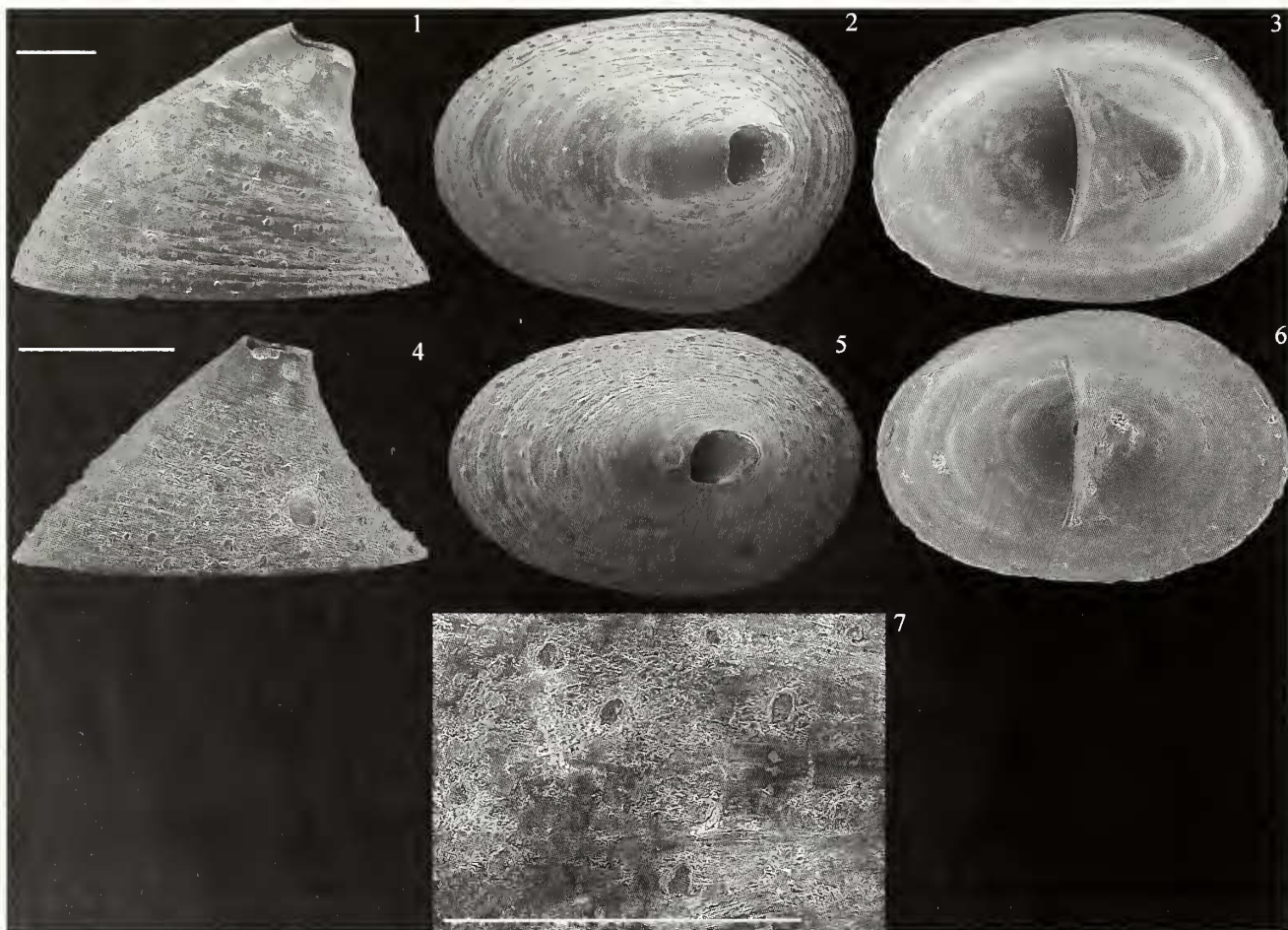
**Type Locality:** Concepción Bay methane seep area, off Concepción, Chile, Southeast Pacific Ocean, RV AGOR VIDAL GORMÁZ, 36° 22' S; 73° 43' W, 846 m depth, coll. & leg. Guillermo Guzmán.

**Etymology:** Named in honor of Guillermo Guzmán, Museo del Mar, Universidad Arturo Prat, Iquique, Chile, who donated the type material of this new species.

**Remarks:** This species lives in or near methane hydrate rubble. The holotype had a portion of the body remaining in the shell, although the head with radula unfortunately was not available.

#### DISCUSSION

Seven species assigned to the genus *Cornisepta* have been recorded in the Pacific Ocean; *C. acuminata*



**Figures 1–7.** *Cornisepta guzmani* new species. 1. Holotype SBMNH 236523, 5.26 mm, lateral view. 2. Holotype, dorsal view. 3. Holotype ventral view. 4. Paratype SBMNH 236524, 2.66 mm, lateral view. 5. Paratype, dorsal view. 6. Paratype, ventral view. 7. Paratype, detail of sculpture. Scale bars = 1 mm.



**Table 1.** Summary of shell characters of *Cornisepta* species from the Pacific Ocean based on Chino (2009), Cowan (1969), McLean and Geiger (1998), and this study. PF: position of foramen.

Species	H	W	L	(H/L)	Profile anterior side	Profile posterior side	Shell sculpture	PF
<i>C. acuminata</i>	4.0	3.5	5.0	0.8	Straight	Slightly concave	Dense, round pustules	0.74
<i>C. antarctica</i>	6.7	4.9	7.0	0.96	Straight to slightly concave	Straight to slightly concave	T-shaped pustules	0.61
<i>C. festiva</i>	5.9	-	5.2	1.13	Convex to slightly straight	Slightly concave	Very tenuous pustules	0.66
<i>C. levinae</i>	3.5	4.1	5.2	0.67	Slightly convex	Slightly concave	Thin, elongate pustules	0.56
<i>C. monsfuji</i>	2.2	1.4	2.1	1.05	Convex	Slightly concave	Axial ordered minute pustules	0.61
<i>C. pacifica</i>	3.6	3.5	4.8	0.75	Convex	Slightly straight	Few small pustules in horizontal rows	0.66
<i>C. soyoae</i>	2.3	2.4	3.6	0.64	Convex	Concave	Pustules in rows arranged obliquely	0.61
<i>C. verenae</i>	1.3	1.3	1.6	0.81	Convex	Concave	Pustules linked in chains	0.56
<i>C. guzmani</i> n. sp.	3.5	3.8	5.3	0.62	Convex	Concave	Pustules widely separated	0.73

Watson, 1883 from the Western Atlantic (290–710 m) is also included (Table 1); *C. antarctica* from the Weddell sea, Antarctica, in 280–700 m depth and the Bellinghausen Sea, Antarctica, in a depth range of 400–500 m (Aldea et al., 2008), *C. festiva* from northwest of the Three Kings Islands, New Zealand, in 805 m, *C. levinae* from the summit of Volcano 6, Eastern Pacific Rise (12° 44' N, 102° 33' W) in 1775 m depth, *C. monsfuji* from the SE China Sea, southwestern Japan in 240–270 m, and from off Olango Island, Philippines, in 60 m, *C. pacifica* from Kiska, Aleutian Islands, Alaska to southern California, in a depth range of 440–880 m (McLean and Geiger, 1998), *C. soyoae* from Sagami Bay, Japan in 120–170 m depth and *C. verenae* from Axial Seamount, Juan de Fuca Ridge (45° 56' S, 130° 04' W) in 1530 m depth. All of the species have shelf to bathyal distributions, and two of them (*C. levinae* and *C. verenae*) occur only at hydrothermal vents (McLean and Geiger, 1998; Sasaki et al., 2010).

*Cornisepta guzmani* has a shell similar to *C. pacifica*; the new species differs in having a lower profile (66 vs. 76% L/H), a more concave posterior profile, a larger angle between the septum and the anterior slope and sparse pustules over the shell. Moreover, *C. guzmani* has been found at cold seeps while *C. pacifica* has not been associated with such habitats. *Cornisepta antarctica* and *C. festiva* differ from the new species in their larger shells with height almost equal or even greater than length (96%, 113% L/H, respectively), have different sculpture of pustules (with t-shaped pustules in *C. antarctica*) that are more delicate than in *C. guzmani*, and straighter anterior and posterior profiles. *Cornisepta levinae* and *C. verenae* differ from *C. guzmani* in the higher profile (67%, 81% L/H, respectively), the more densely ornamented shell, and the comparatively smaller and more neatly ordered pustules, with *C. verenae* exhibiting a distinct sculpture of chained pustules encircling the shell. *Cornisepta*

*monsfuji* and *C. soyoae* differ from the new species in having smaller shells, higher profiles (*C. monsfuji* has a taller than wider shell), and more strongly ornamented shells, with pustules aligned in vertical rows in *C. monsfuji* and in oblique prosocline rows in *C. soyoae*. They also have bathymetry ranges shallower than *C. guzmani*. *Cornisepta acuminata* has much denser pustules and a much taller shell.

So far, *C. guzmani* has the lowest shell profile, with the most posteriorly placed foramen of all the Pacific *Cornisepta* species. It is also the second species to be recognized living at a cold seep, after *C. acuminata* (Watson, 1883), reported for the Simu River delta methane seep (09° 02' N, 76° 02' W), Colombia in 500 m depth (Gracia et al., 2011), and the first such fissurellid species for Chile and the southeastern Pacific coast.

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